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## Statistical analysis of demographic aging of the population

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### Abstract

This article covers the following problematic issue: how to predict uncertainties modeling the brand vulnerability? In order to solve the problematic issue a method of brand vulnerability prediction is substantiated theoretically also the empirical methods assisting in implementing them are identified. After carrying out the empirical method based on the Lithuanian market of mass cosmetic products uncertainties modeling brand vulnerability in the mentioned market for the year of 2020 are identified.

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**Keywords:** Uncertainty; brand vulnerability; brand risk; future tendencies; methodology.

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### 1. Introduction

The process of demographic aging of population is a regular phenomenon and as one of the most topical social-economic problems of modern times, needs particular attention and rational use of resources. If in the past it was typical to the developed countries only, now, it has become a global problem of unprecedented scales. The process includes social, economic and demographic aspects, and its regulation must be one of strategic trends of the state policy. Consequently, it needs a complex study to be accomplished by not only demographers, but also economists and statisticians, sociologists, psychologists and medical representatives to objectively assess the said process and identify its advantages.

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Demographic aging of population meaning the increased specific weight of the aged people (65, sometimes 60 years or older) in the total number of population, is the result of long demographic changes in the kind of the population reproduction, birth rate, death rate, ratio between them, increased average life span and partially, changes in the migration modes. Unlike the biological aging of people, it is a social process and is associated with the age structure evolution of the population.

As per the international criteria, Georgia is a demographically aged country and is the poorest country of the world. Such state of affairs puts the question of solving a double problem – the rapid aging of the population and the incomplete shift to the developed market institutions – on the agenda.

In order to correctly identify the major trends and reference points in the social and economic development of Georgia, the study of the number of population and their demographic aging in respect of gender, region, city and village is much important. Consequently, the goal of this study is to conduct the statistical study of demographic aging of the population and describing the peculiarities of this process in Georgia.

## **2. Method**

The study uses the methods of statistical observation, grouping and analysis, the methods of analytical indicators of time series, trend identification and correlation-regressive analysis, and the predicted values are calculated.

For prediction purposes, EvIEWS computer pack was used. Among the selected options, the AR-type model of average creeping value, which was added by the trend component to improve accuracy.

## **3. Results**

Georgia is a demographically aging country having acquired this status as early as in the 1970s. In the 1990s, the process of demographic aging in Georgia was accelerated as the social-economic crisis reached its peak. This process was particularly intense in 1992-1997 due to two major reasons: (1) the birth rate among the population was lower than the rate of simple reproduction in 1992-1993, and (2) the first half of the 1990s was marked by intensified emigration of the population mostly under 60.

In 1990-2008, the population of Georgia decreased by 19,5%, while a 11% growth was fixed in 1975-1990. This was followed by the population aging. The described processes pose a serious danger to the regeneration of the generations and are a heavy burden for the employed population.

The statistical data of 2005-2012 are worth attention, as they evidence the growing number of the lively born (refer with: Table 1). This indicator significantly increased in 2009 and 2010 and the growth reached 36,3% and 34,1% respectively, as compared to the same indicator in 2005. The growth was fixed both, in urban and rural areas. Besides, the regeneration of the generations has also become more intense, and this is another important indicator in demography. The number of marriages increased and the number of children born without the registered marriage decreased as compared to the past years. In a certain respect, this is also a positive change. The births of the second and third babies in the family have also increased, and there is no disturbed quantitative ratio between the sexes of the lively born. As per the data of 2009, 104,5 boys were registered per 100 girls. As for the following years, the number of boys per 100 girls was as follows: 107,9 in 2010, 109,6 in 2011 and 109,4 in 2012, evidencing a regular ratio. These changes are the result of not some active demographic policy, but the initiative of the Patriarch of Georgia regarding the birth of every third baby in a family. At this point, it should also be mentioned that no matter how favorable the statistics of the recent 5 or 6 years is, this only cannot compensate the situation established for the last two decades in Georgia. A 2-year-long increase in the birth rate cannot cause cardinal changes. Such changes are possible through long processes only.

Table 1. Main Demographic indicators of Georgia in 2005- 2012

	2005	2006	2007	2008	2009	2010	2011	2012
Population for the beginning of the year (thousands)	4321.5	4401.3	4394.7	4382.1	4385.4	4436.4	4469.2	4497.6
Live births	46 512	47 795	49 287	56 565	63 377	62 585	58 014	57 031
Deaths	40 721	42 255	41 178	43 011	46 625	47 864	49 818	49 348
Natural increase	5 791	5540	8109	13 554	16 752	14 721	8 196	7 683
Life expectancy at birth	74.0	74.2	75.1	74.2	73.6	74.4	74.5	74.7
Birth rate (per thousand population)	10.7	10.9	11.2	12.9	14.4	14.1	12.9	12.7
Mortality rate (per thousand population)	9.3	9.6	9.4	9.8	10.6	10.7	11.1	11.2
Natural increase rate (per thousand population)	1.3	1.3	1.8	3.1	3.8	3.3	1.8	1.7

The indicator of the demographic aging of population, which is the specific weight of the people aged 60 or more in the total number of population was 18-19% and the specific weight of the people aged 65 or more in the total number of population was 13-14% in 2003-2013. According to the Rosette and UNO Scales, this is a very high indicator of aging. In the period between the censuses of 1989 and 2002, the average age of the population in Georgia increased by 2.5, and is now 35,4 years. The life expectancy also increased by 3 years in 2012 as compared to the data of 2002 and is 74,7 years. The value of this indicator differs for different sexes, and it is 79 for women and 69 years for men. It should also be mentioned that in 2012, 18,5% of the economically active population was older than 60 years old, 11,5% of the economically active population was older than 65 years old and only 11.0% of the economically active population was younger than 25 years old (an approximate growth trend in 2007-2011). Thus, in a demographic respect, the aging of the population in Georgia is an obvious trend. The most aged population of Georgia is found in south Caucasus: in Azerbaijan the aging index is 6,7% and it is 10,6% in Armenia.

The demographic aging of the population is followed by the increased demographic-economic load for the able-bodied (particularly, for the employed people). The proportion of the disabled per one thousand able-bodied people in Georgia is increasing. If considering that the level of unemployment is persistently high, the demographic load will seem a much severer problem. The specific weight of the people not having reached the working age in the demographic load increases and the specific weight of the people older than the working age increases accordingly. The load of the aged in 2013 was 4% higher than in 2002, and has doubled since 1897. The specific weight of the children younger than 16 decreases and the number of pensioners increases. The aging index for the last fifty years has increased almost 8-fold, from 10,4% to 81,2%. This process is particularly intense in rural areas with the people migrating to urban areas due to hard living conditions. Migration of the people from villages to cities (mostly, of the young people) is most intense in the northern high-mountainous regions of Georgia of all the regions of the country. Consequently, the major population in these regions is the elderly. The rate of death in the regions distinguished for demographic aging is drastically higher than the mean value in the country, it often exceeds the birth rate and cause depopulation.

The aging process is particularly painful for the labor market and system of social protection, as the social costs increase is a hard load for the employed. At present, there are 75 hired employees per 100 pensioners, while the optimum proportion is 350-400 hired employees per 100 pensioners. Moreover, if considering that over half of the employed are women, the income tax paid by the employed women used to give out pensions is augmented by the women's labor in their own families while taking care of the elderly, being a double load for a woman. The aging index for the last fifty years has increased almost 8-fold, from 10,4% to 81,2%.

The indicators of migration are worth attention. From 1990, mass migration took place in Georgia. As per different sources, 2/3 of the migrants have left the country for economic considerations, while 1/3 of them left the country for ethnic reasons. In addition, the number of the reproductive and able-bodied people was particularly high in the total number of the migrants. In 2013, 90.584 people left the country, with 80,2% of them being able-bodied, while 76,8% of the emigrant women were of a reproductive age.

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The calculated prediction values prove the forecast of the UNO experts about the demographic aging of the population in Georgia continuing in the future; however, if we manage to maintain the situation of 2005-2012, aging will be slower.

#### 4. Discussion/Conclusions

The study has demonstrated that Georgia is among the aging countries and is the most aged country in the South Caucasus. The medium age of the population in Georgia is 5 years more than that in Armenia and is 7 years more than that in Azerbaijan. Besides, Georgia is 30% older than the average world index suggests (37 and 29 years, respectively).

Increase in the birth rate will not be endless or thorough; however, in this respect, Georgia is in a much better position than say, the Russians or Ukrainians. The latter have much severe demographic problems. Similar trends are observed in Armenia and Azerbaijan. The difference between our country and them is not as great as it was ten years ago. However, the level of demographic aging in those countries is lower than in Georgia, because the negative demographic trends started much later there than in Georgia. However, sooner or later, the South Caucasus, as well as the whole world will face this problem.

Such state of affairs has had a significant impact on the demographic aging of the population, and with great probability one can talk about the Georgian type of demographic transition, which is closer to the French type characterized by decreased birth rate in terms of factually unchanged (permanent) of the death rate. .

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